2006 Annual Insect Report

UDAF

Utah Department of
Agriculture and Food

Utah Department of Agriculture and Food
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Division of Plant Industry
2006 Insect Report

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Protecting Utah's Agricultural Industries From Invasive and Native Pests

Introduction

In the absence of pest management, harmful insects could seriously cripple Utah's billion dollar-a-year agricultural industries. The future of Utah's food production environment depends upon effective control of damaging insects by producers and governmental agencies.
The Emergency Insect Program began in 1985 with the enactment of the Insect Infestation Emergency Control Act (Chapter 35, Utah Code). The following information highlights the major insect programs conducted by the Utah Department of Agriculture and Food, Division of Plant Industry.

The Utah Department of Agriculture and Food, Division of Plant Industry is helping producers in the state to control harmful insects and other agricultural and public nuisance pests by: (1) establishing insectories to rear natural predators for distribution; (2) trapping and monitoring insect movement, and (3) supporting research for better control methods that can be used in pest management programs.

We hope that you will find this publication to be informative and useful with regards to the insects that threaten the quality and viability of Utah's agricultural economy and environment.

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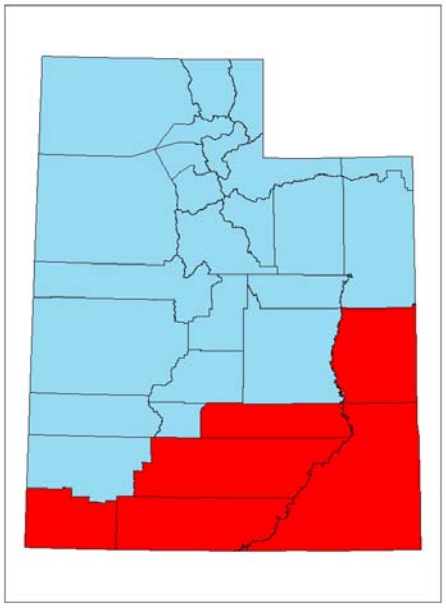


2006 Survey Program

The Africanized honey bee (*Aphis mellifera scutellata)* was unfortunately released in Brazil in 1956. Since then, it has migrated steadily northward, towards the United States. Since it was first discovered in the U.S. in 1990, the African honey bee has migrated into Arizona, Nevada, New Mexico, Texas and Southern California. Based upon experiences in Mexico and Texas, the northward migration of the Africanized honey bee cannot be stopped.

The Africanized honey bee is a serious threat to the beekeeping industry because its aggressive behavior will displace domestic honey bees and compete for resources. Utah's beekeeping industry produced $1.1 million dollars worth of honey in 2006.

The Africanized honey bee will always present a public health threat because it tends to sting more readily and in greater numbers than does the domestic honey bee.

Rather than imposing additional regulations, the Utah Department of Agriculture and Food along with Utah's beekeeping industry will approach the problem with surveys with early detection, management, and education of beekeepers and others involved with the program.

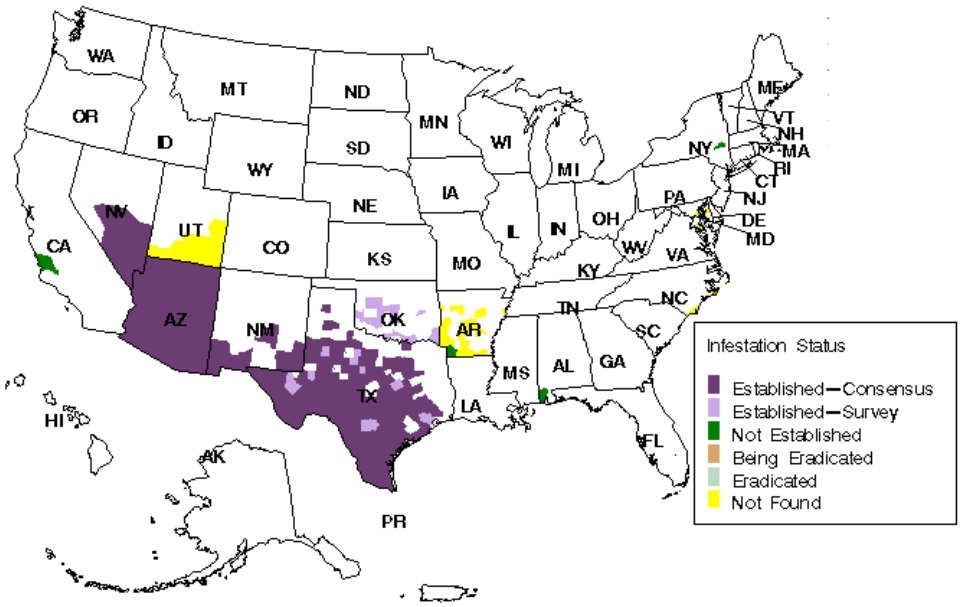
The Utah Department of Agriculture and Food has put into action a detection program in the southern portion of the state consisting of 125 detection traps. There were no confirmed detections of Africanized honey bees in Utah during 2006 from the survey.

Action Plan for 2007

The Africanized honey bee is a serious threat to Utah's beekeeping industry, and is also a public health threat. In 2007 UDAF plans to continue detection trapping of the African honey bee to determine if it has migrated into the state. UDAF will also continue to

conduct education and outreach on issues concerning the African honey bee to the public and the beekeeping community.

Reported Status of
AFRICANIZED HONEY BEE (AHB) , APIS MELLIFERA
in US and Puerto Rico (01/01/2005–12/31/2005)
Data retrieved from National Agricultural Pest Information System on 02/11/2006



The Center for Environmental and Regulatory Information Systems does not certify the accuracy or completeness of the map.

Apple Maggot / Cherry Fruit Fly Survey Program

Quarantine Pest

2006 Survey Program

The apple maggot (*Rhagoletis pomonella*), also known as the "railroad-worm", is a picture-wing fly native to North America. The cherry fruit fly (*Rhagoletis indifferens),* is also native to North America. It is blackish in color with tinges of yellow on the head and lateral margins of the thorax. Both insects have become a major pest of fruit trees in the U.S. and Canada.

Fruit marketed for export must be free from all apple maggot and cherry fruit fly injury. Therefore, thorough and effective control measures are necessary. There are more than 300 commercial fruit growers in Utah, with a commercial value of more than 18 million dollars annually. With Utah's apple maggot and cherry fruit fly program in place, fruit growers in Utah are able to export fruit to states that have quarantines against these pests. *All western states have apple maggot and cherry fruit fly quarantines.*

The Apple Maggot Program began in 1985 with the discovery of the apple maggot fly in Utah County; it has been subsequently amended to include cherry fruit fly detection and control. The program provides commercial growers with information that helps with better timing for insecticide spraying. Accurately timed sprays result in fewer insecticides being used with less harm to the environment and lower production costs. Without proper control, these insects could cause serious damage to all tree fruit grown in the state.

Apple maggot catches have decreased from over 60 in 1994 to less than 10 in 2002 and 0 in 2006. UDAF employees monitor approximately 600 insect traps during the growing season. *No apple maggots have been found in commercial orchards. All apple maggot catches have been in abandoned or non-commercial orchards.*

Action Plan for 2007

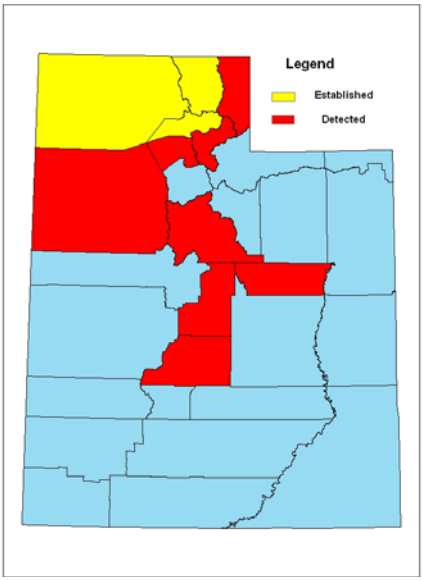
UDAF plans to continue its detection trapping program in 2007, providing commercial fruit growers with vital information to prevent apple maggots and cherry fruit flies from spreading and affecting the quality and marketability of Utah's commercially grown fruit.

Cereal Leaf Beetle Survey Program

Quarantine Pest

2006 Survey Program

Counties with Cereal Leaf Beetle



The cereal leaf beetle (*Ouleama melanoplus)* is a small, metallic blue and red beetle. It originated in Europe, and was first identified in the U.S. in 1962.

Both the larva and adult feed on the leaves of small grains such as barley and oats. The cereal leaf beetle has the potential to seriously damage crops, reducing harvests by 75%. For this reason, domestic grain markets require fumigation of grain or guaranteed insect free shipments to prevent the spread of the cereal leaf beetle. *Many western states have a quarantine in place for the cereal leaf beetle, including Arizona, California, and Nevada*

By the late 1970's, the insect had spread to all parts of the Midwest and Northeast, found in DE, IL, IN, KY, MD, MA, MI, NJ, NY, OH, PA, TN, VT, VA, WV, and WI. In addition, current NAPIS records show that it has been found in AL, AR, GA, IA, ID, KS, ME, MS, MT, NC, SC, UT, VT, and WY.

Small grains and field crops represent Utah's greatest agricultural strength, with a 2006 total production value over $340 million dollars.

The cereal leaf beetle was first identified in Utah in 1984. Now 10 of Utah's agricultural counties; including the nine northernmost counties, have cereal leaf beetle. Cereal leaf beetle was caught for the first time in Carbon County in 2006.

The Utah Department of Agriculture and Food conducts an annual survey in cooperation with Utah State University to determine the range and density of the cereal leaf beetle population. A cooperative insectory program to produce natural predators of the cereal leaf beetle has been undertaken by UDAF, APHIS, and USU. Investigations into the effects of biological controls of cereal leaf beetles are underway in Cache and Davis counties. Initial results indicate that biological control has the potential to reduce the cereal leaf beetle population by 75%.

Action Plan for 2007

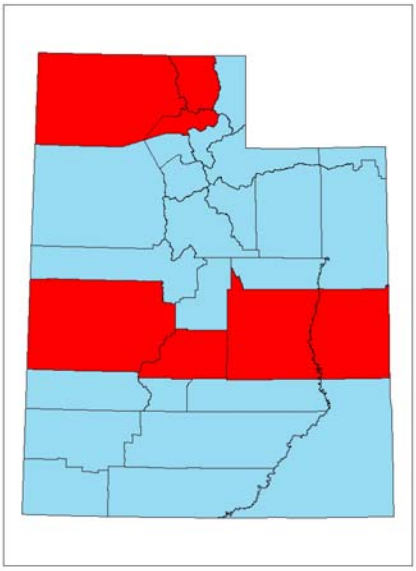
The cereal leaf beetle presents a serious threat to Utah's agricultural industry. UDAF will continue its program of survey trapping of this quarantined insect. UDAF will also continue to provide funding and expertise to the cooperative insectory program to produce biological controls of the beetle. Phytosanitary certification is necessary to continue export of hay and grain to other states and countries.

European Corn Borer Detection Program

Quarantine Pest

2006 Survey Program

Counties with Traps



Utah has a quarantine (R68-10) in position for small grains and other agricultural crops that may contain the European corn borer in order to prevent this destructive insect from entering the state. A state trapping program is launched every year in chief corn producing areas for this grave pest. In 2006, 72 traps were positioned in eight counties. All through its early history in the United States, the European corn borer spawned one generation yearly. By the late 1930's, a two-generation per annum European corn borer mushroomed swiftly and soon became dominant in the central Corn Belt. It established itself in Illinois in 1939, Iowa in 1942, Nebraska in 1944, and South Dakota in 1946. Meanwhile, the single-generation European corn borer extended northward into northern Minnesota, North Dakota, and the Canadian provinces of Quebec, Manitoba, and Saskatchewan.

The Utah Department of Agriculture and Food (UDAF), in association with the United States Department of Agriculture (USDA), has launched a European corn borer trapping program. This program took place in eight counties throughout Utah. The counties where traps were set are: *Cache, Box Elder, Weber, Davis, Utah, Sevier, Sanpete, and Emery County.* No new records of the European corn borer were found in the state of Utah in 2006.

County	# of Traps
Cache	12
Box Elder	12
Weber	12
Davis	12
Utah	6
Sevier	6
Sanpete	6
Emery	6

Action Plan for 2007

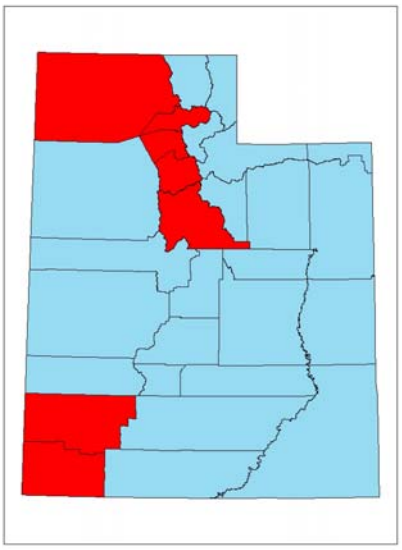
Utah Department of Agriculture and Food will persist in its trapping program to detect the occurrence of European corn borer. Detection information is crucial to agricultural producers so that they may protect their crops from this devastating insect. Approximately 100 traps will be placed in the corn producing areas of the state.

False Codling Moth Detection Program

Fruit and Agricultural Pest

2006 Detection Program

Counties with Traps



False codling moth, *Thaumatotibia leucotreta* (Meyrick), is a significant pest of fruit trees and field crops in Africa. Climates suitable for this pest vary from tropical, to dry or temperate. False codling moth is native to Ethiopia, and is present in much of Sub-Saharan Africa. Based on the classification of climate zones, 20% of the United States represents suitable habitat for this pest. Much of the suitable habitat within the United States falls within Utah's borders (Fig. 1).

High risk crops in Utah include all fruit trees and corn. In addition, several wild plants native to Utah are possible hosts. Utah's fruit industry is responsible for more than $18 million annually, and corn is a $31 million industry; both of these industries could be significantly damaged by a false codling moth infestation.

In 2006, 505 traps were placed in 7 counties. Trapping targeted high risk area such as railroads, airports, and bonded warehouses. Zero catches of the false codling moth occurred in 2006.

2007 Action Plan

The Utah Department of Agriculture and Food will continue its trapping efforts in 2007 by targeting businesses and the vectors through which they bring their products to Utah. Traps will be placed in the highest risk areas. 100 traps will be placed and checked bi-weekly.

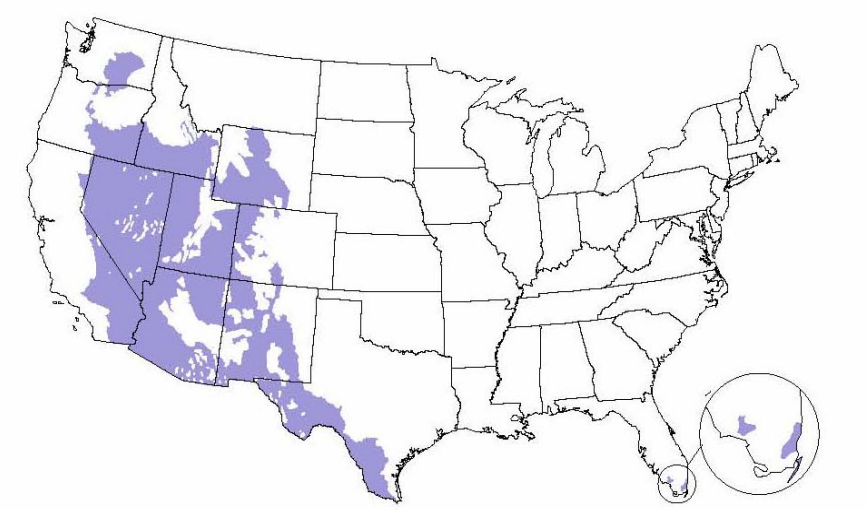
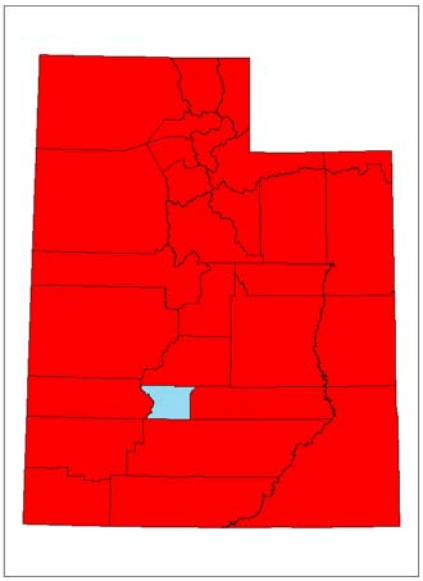


Figure 1. Predicted distribution of *Thaumatotibia leucotreta* in the continental United States according to CAPS risk assessment.

Gypsy Moth Detection Program

Defoliator/Quarantine Pest

Counties with Traps



2006 Survey Program

The Gypsy Moth (GM) detection program is conducted by a large scale trapping along the Wasatch Front and throughout Utah. The 2006 Utah Gypsy Moth Program placed 3055 detection and delimiting traps. This trapping allows the state to identify problems and act quickly to suppress damaging insect populations. Gypsy Moth infestations cause damage by defoliating trees.

Gypsy Moths were first found in Utah in 1988. Since that time Utah Department of Agriculture and Food has been the lead agency in the administration of a major survey and control program that has had a 100% success rate. Moth catches have been reduced from 2,274 in 1989 to 0 in 2006.

Utah's arid climate, mountainous terrain, and lack of effective natural predators for Gypsy Moth, make the state have a high potential for Gypsy Moth infestation, and subsequent mass deforestation. Since Utah is not part of the contiguous range of Gypsy Moths in the Eastern United States, a program of prevention and eradication is more cost effective and beneficial to the State in the long term.

Eradication measures thus far have focused upon using the biological insecticide *Bacillus thuringiensis var. kurstaki (*B.t.k). B.t.k. is a naturally occurring soil bacterium that causes the Gypsy Moth larvae to become sick and eventually die. The insecticide has been used successfully in Utah since 1989, treating over 70,000 acres. In May 1999, 764 acres in one location of Salt Lake County were sprayed with B.t.k. This spray program was initiated after 32 Gypsy Moths were detected at seven locations in 1998. Only seven moths were caught the following year, and the number of catches has dropped to zero in 2006.

This year, 2006, the GMWest model (BioSIM) was introduced and integrated into the Utah Gypsy Moth program. The model works by linking meteorological and elevation data to the phenology of North American Gypsy Moth(NAGM). The model predicts NAGM establishment, this information is then used to target high risk areas for detection trapping. After implementing the GMWest Model 700 detection traps were eliminated because of a low risk of NAGM establishment. The reduction in traps was primarily in high elevation areas.

Trapping

Delimiting Traps:

The Trapping Sub-committee decided that each location in the Pine Brook area with positive gypsy moth detections in recent years should receive additional attention by further concentrating the delimiting traps during the current trapping season. The Gypsy Moth trapping program detected two Gypsy Moths in the Pine Brook area over the past two years, one each during the 2004 and 2005 seasons. In an effort to delimit populations in the Pine Brook area of Summit County, a 115.5 ft grid was placed (covering 213 acres); in addition to a 500 ft grid centered on each positive trap detection. The concentrated search covered an area of one mile by one mile (640+ acres), that consisted of a total of 737 Gypsy Moth traps. Also, the standard 500 ft delimiting grid was placed in the Salt Lake City "Avenues" area at the location where the another 2004 positive Gypsy Moth was caught in Salt Lake County.

Detection Traps:

North American Gypsy Moth Survey:

In 2006 the risk categories for North American Gypsy Moth infestation were revisited in the State of Utah due to population growth. The risk categories are divided into five divisions, category 1 being the highest and 5 the lowest. Category 1 areas were added in Cache County and Iron County. Overall detection in the state was reduced by approximately 700 traps due to a low probability of establishment as predicted by the GMWest model. 3,055 detection traps were placed in 28 counties. Zero North American Gypsy Moth catches occurred in the state in 2006.

Asian Gypsy Moth Survey:

Eighteen traps were placed specifically for the Asian Gypsy Moth throughout the state, in high-risk areas such as Hill Air Force Base and railroad yards throughout the state.

All traps in the State of Utah were negative in 2006.

Action plan for 2007

The Cooperative Gypsy Moth Survey and Detection Program for 2007 will place between 1500 and 1600 traps for the state detection network. The 500 foot delimiting grid in the Avenues will be reduced to standard detection due to the zero Gypsy Moth catches for two years running. The Pine Brook grid will be reduced to the standard 500 foot grid as follow up of the 2004/2005 positive catch, but the 115.5 foot grid within the standard grid will be dropped. After reviewing the Risk Class categories for the State of Utah, it was

determined that along the Wasatch Front, the Category 1 inter-trap distance (ITD) of 1330 feet is unnecessary for the trapping program and that it would be expanded to an (ITD) of 2640 feet, resulting in half mile placements rather than quarter mile placements. In addition, the placements will be staggered from year to year thus covering a greater area over time. This will reflect the standard method of trapping according to the USDA, APHIS Gypsy Moth Manual. Trap placements will continue to be reviewed annually.

The following changes will be conducted in order to keep the Utah Cooperative Gypsy Moth Survey and Detection Program current:

- Update risk map generated by the GMWest phenology model by adding current year weather data.

- Re-design trap cards using high resolution aerial photos.

- Update trap placements along with risk class categories.

Year	Traps Placed	Acres Sprayed	Moth Caught
1988	1,737	0	925
1989	5,398	1,190	2,274
1990	7,469	20,064	577
1991	7,818	29,925	192
1992	10,958	15,718	94
1993	10,126	5,135	5
1994	4,035	0	0
1995	1,680	0	0
1996	1,964	0	7
1997	2,954	0	47
1998	4,599	916	32
1999	5,461	764	7
2000	6,905	0	3
2001	5,046	0	1
2002	3,812	0	1
2003	3,534	0	2
2004	3,270	0	3
2005	2,917	0	1
2006	3,055	0	0

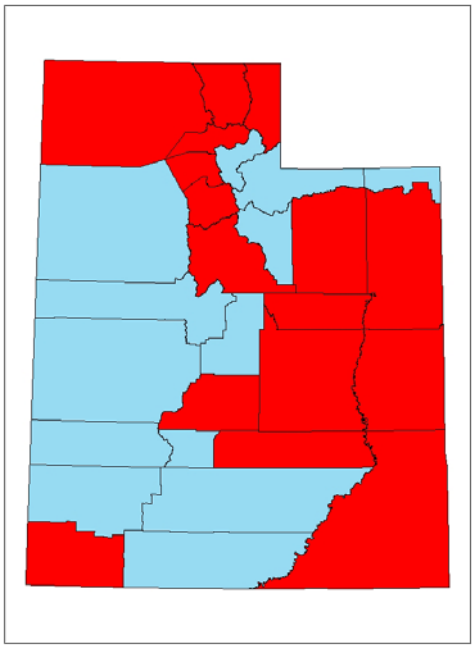
Figure 1. Historic trapping, treatment, and catches in Utah.

Japanese Beetle Detection Program

Quarantine Pest

2006 Survey Program

Counties with Traps



The Japanese Beetle (JB) was initially discovered in the U.S. near Riverton, New Jersey in 1916. They were introduced into the U.S. from Asia on nursery stock. Two years later the U.S.D.A. & New Jersey authorities undertook efforts to abolish this pest but the infestation was so well established that extermination became unattainable. There were not adequate monies or control measures in use at this time and in the course of its first 8 years in the U.S., infestation had bloomed to over 2,500 square miles.

Since its introduction, the JB has swept throughout most of the U.S. east of the Mississippi. Because of the potential of artificial spread, the JB is a great menace to agriculture and flora of the Western U.S. The JB is a highly ruinous plant pest causing both plant damage and increased control costs. Adults attack more than 300 species of plants, including corn. Numerous trees, ornamental shrubs & vines, fruits, flowers, other vegetables, garden crops, weeds, and field crops are also often damaged. The grubs are serious pests of lawns, other grasses, and nursery stock. Because of the ease of shipping grubs with nursery stock & soil, this species could potentially be found about anywhere in the U.S. including Hawaii and Puerto Rico. Adults are highly movable and frequently 'hitch' rides in airplanes and motor vehicles. The larvae are dispersed in transported soil and nursery inventory. JB control by biological methods or insecticides is often expensive due to the labor, equipment, and/or insecticides involved.

State plant pest and regulatory officials in uninfested regions are concerned about the induction of JB. To shelter uninfested areas cooperative Federal/ State regulatory programs have been active for about 50 years. USDA/APHIS-PPQ sustains the Japanese Beetle Quarantine (JBQ) & Regulations that can be found in 7CFR 301.48. The objective of the JBQ is to protect the agriculture of the Western U.S. and ward off the artificial expansion of the JB from the Eastern U.S. The JBQ is explicitly fashioned to reduce artificial spread of JB's by aircraft and other possible means. The Western states protected by this quarantine are: *Washington, Oregon, Idaho, California,* ***Utah****, Arizona,* and *Nevada* with *Montana* in the process of being annexed to the list.

In addition, Utah has a trapping survey and detection program in place, to eradicate and/or deter the establishment of this destructive insect into the state. In 2006, a total of 581 traps were set in the following counties: *San Juan, Wayne, Grand, Emery, Sevier, Carbon, Uintah, Duchesne, Utah, Salt Lake, Davis, Weber, Rich, Cache,* and *Box Elder* (Figures 1 and 2).

Despite these efforts, a JB was found mid-July in Orem, Utah by a resident familiar with insects. This find initiated a delimiting trapping program to determine the spatial extent of JB infestation (Figures 3 and 4). 100 JB traps were set in grid fashion and the infestation epicenter proved to be near the 400 North and 600 West areas. A total of 675 JB were trapped throughout the season.

Currently, the most effective means in attracting adults are dual-lure traps, containing both floral & pheromone lures. They are commercially prepared, with sustained-release dispensers that disperse the pheromone lure for 75 – 100 days. These were the types of traps used this trapping season (2006).

Action Plan for 2007

The positive finding of JB in Utah is of major concern. Protecting Utah's healthy $150 million nursery and tree fruit economy is and should be a high priority. Doing so will involve a three pronged approach including: treatment of infested area (Figure 4), an expanded delimiting trapping program (Figure 6), and an expanded detection trapping program in high risk areas (Figure 5).

Eradicating the JB population is a preferred option, while population levels remain low and are confined to a small area. This can be accomplished by treating the infested area with an insecticide. Utah Department of Agriculture and Food, Orem City, and Utah County officials have met regarding this goal and involved parties agree that eradication should be pursued. This is an ongoing process and is being actively pursued.

Delimiting trapping protocol will be expanded to comply with USDA/APHIS-PPQ Japanese Beetle Quarantine (JBQ). This is necessary to track the possible spread of JB populations surrounding the current affected area. An estimated total of 449 traps will be set in a 49 square mile area surrounding Orem (minus those to be set in unsuitable habitat).

Detection traps will be greatly expanded to 3,500 statewide. These will be placed in high risk areas and in habitat suitable for JB propagation. These suitable areas have been determined by vegetation type and traps will be set at 2 per square mile consistent with JBQ. It will be necessary to trap over a number of years to adequately trap these areas.

Given these facts, UDAF will continue in its efforts to identify the happenings of Japanese beetle in the state. Discovery and treatment tactics are critical to Utah's healthy $124 million economy.

County	# of Detection Traps	# of Delimiting Traps
Box Elder	7	
Cache	8	
Carbon	3	
Davis	121	
Duchesne	1	
Emery	1	
Grand	7	
Rich	2	
Salt Lake	116	
San Juan	2	
Sevier	6	
Uintah	3	
Utah	99	100
Washington	4	
Wayne	2	
Weber	99	

Figure 1. Trap type and number per county.

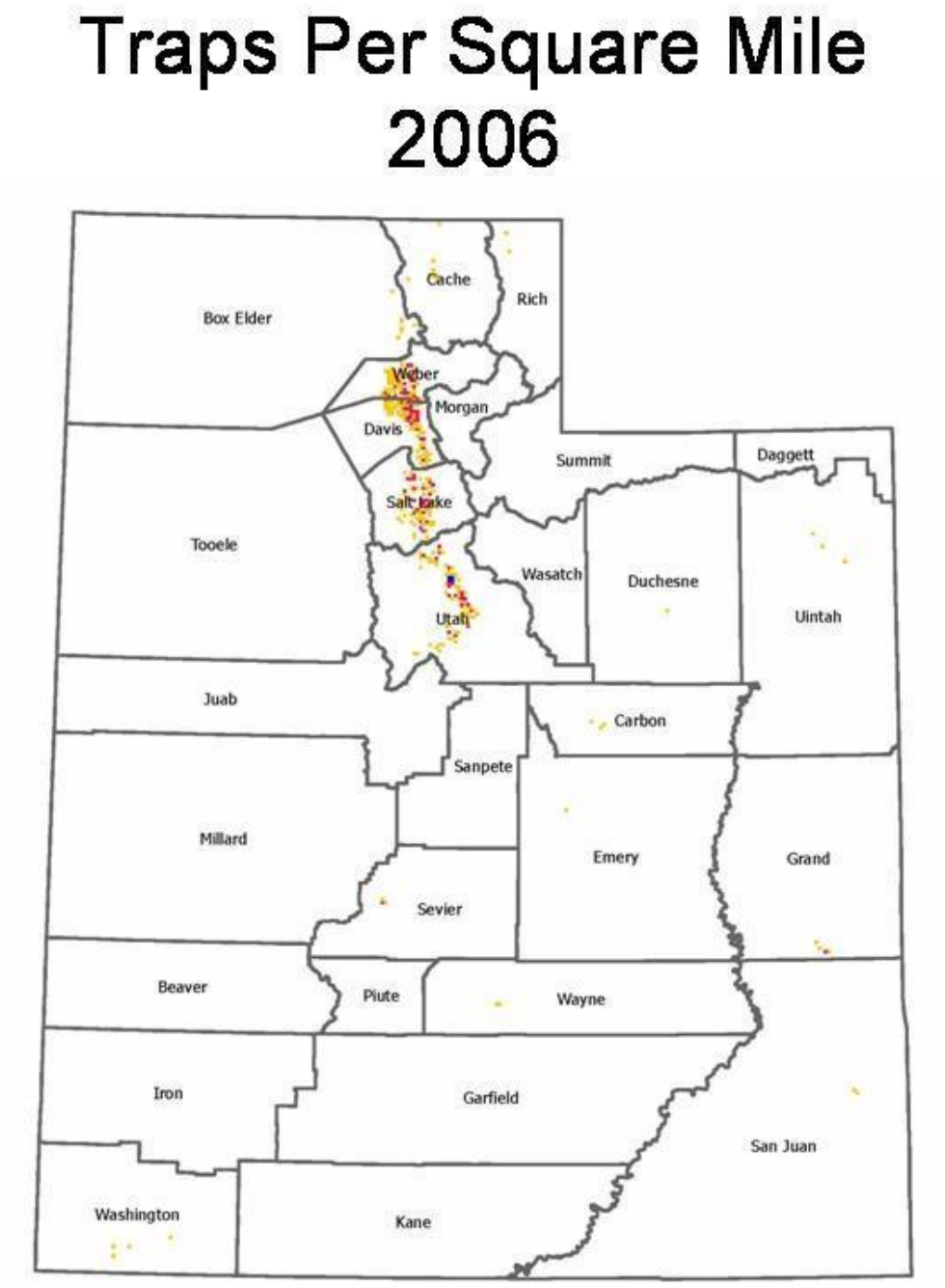


Figure 2. Traps per square mile.

2006 Japanese Beetle Traps
Utah County

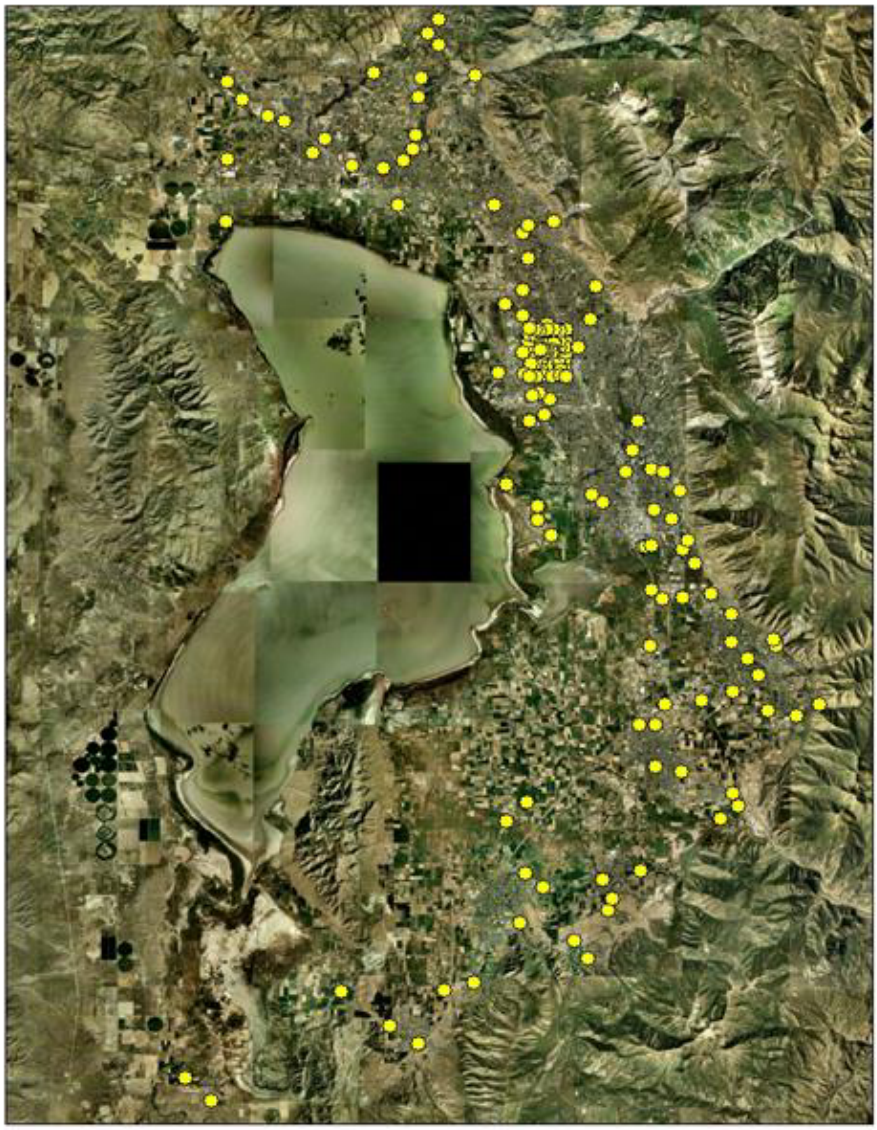


Figure 3. Traps located in Utah County

Trap Catches and Statistical Risk Assessment

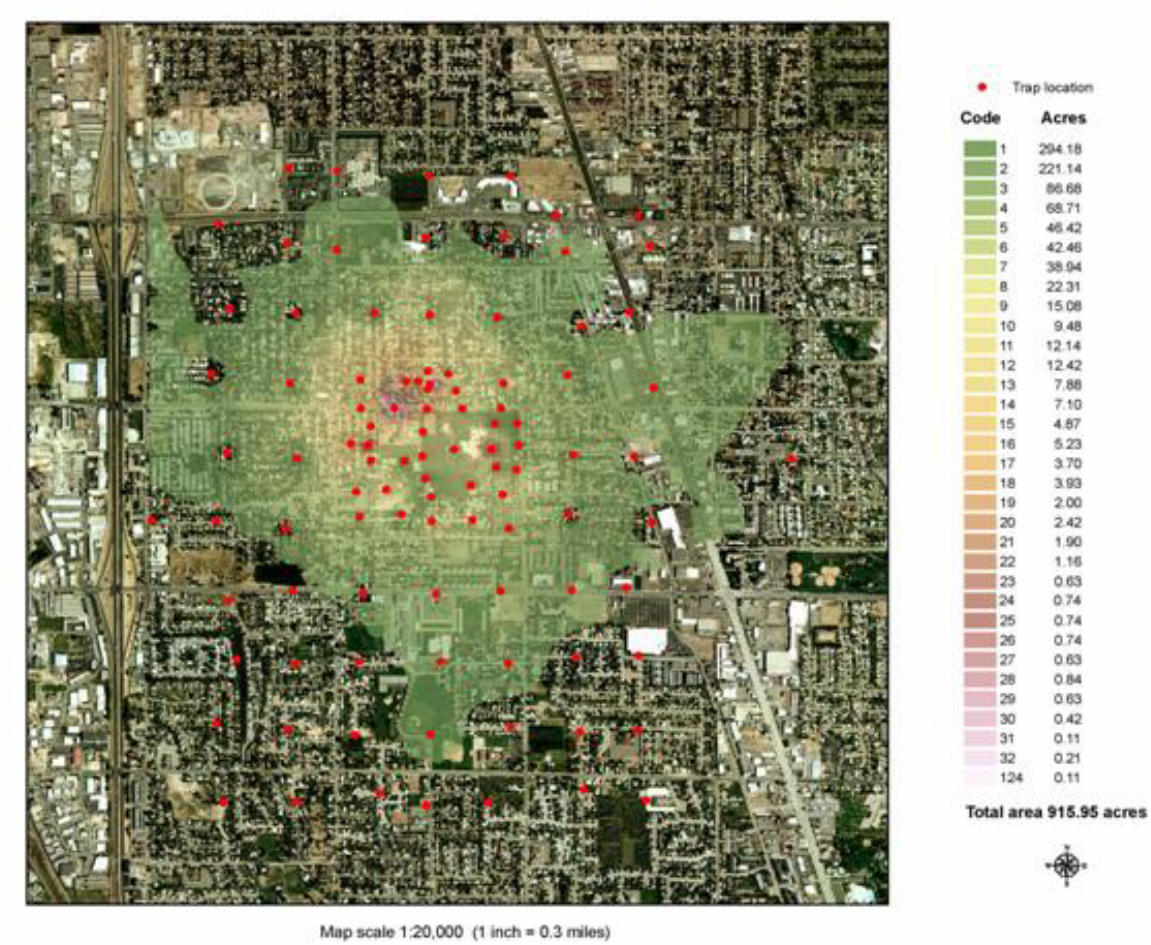


Figure 4. Trap locations in infested area and proposed treatment areas.

Proposed 2007 Trap Placements Per Mile

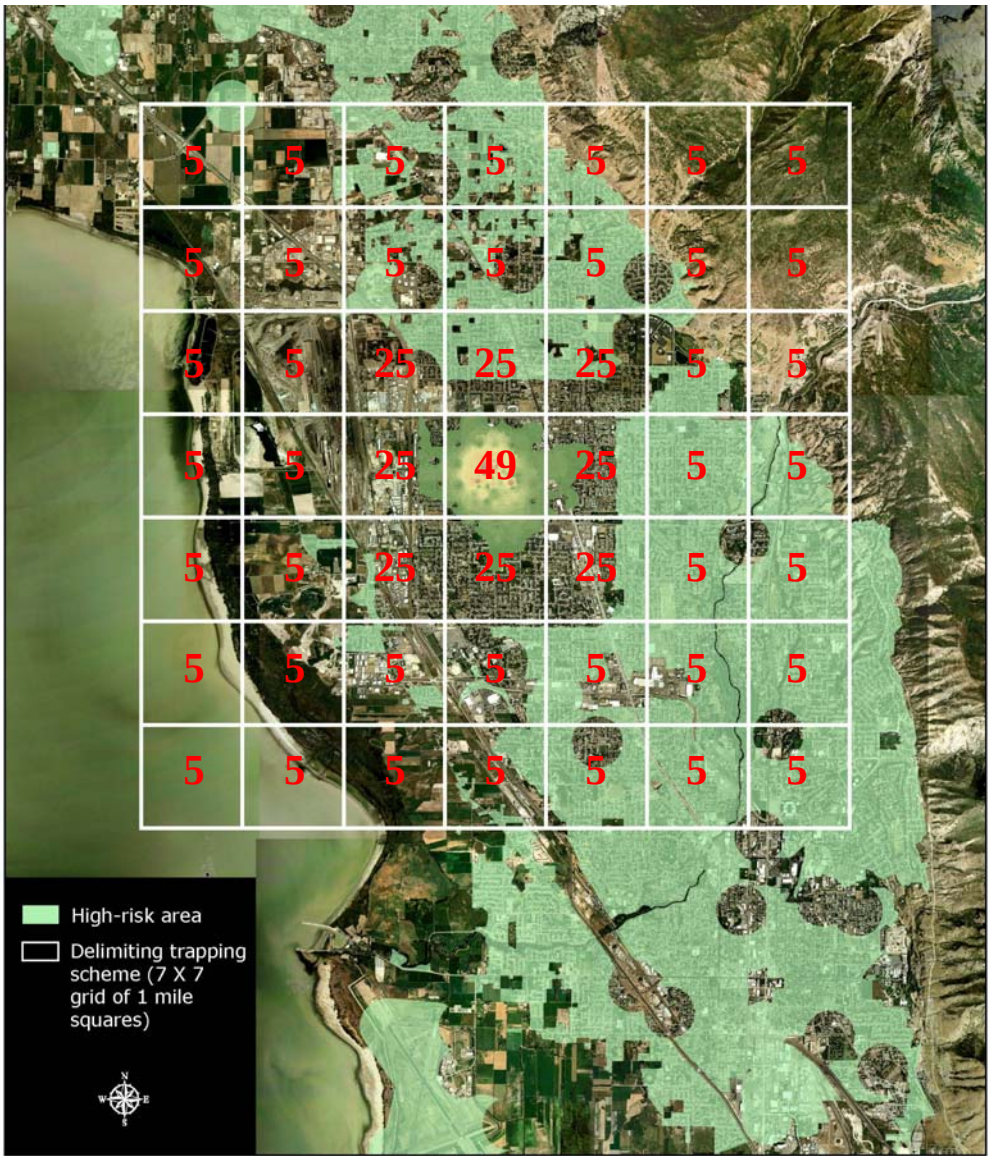


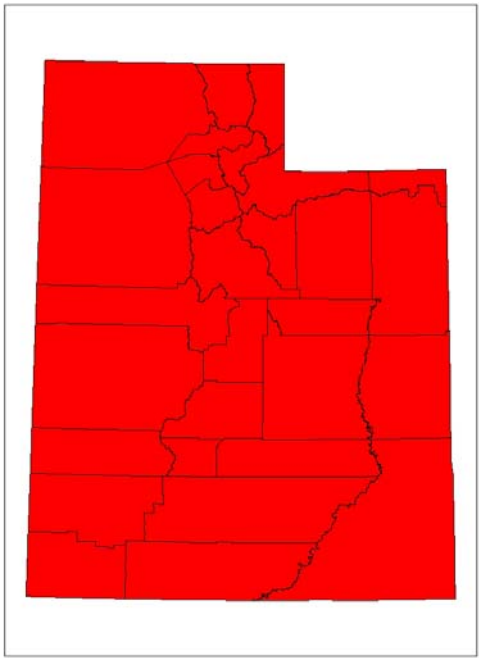
Figure 6. 2007 Proposed trap placement in Utah County.

Mormon Cricket and Grasshopper Program 2006

Agricultural Pest

2006 Survey and Eradication Program

Counties Surveyed



Grasshoppers and Mormon crickets are members of the native ecosystems of the U.S. They emphasize an important role, serving as food for wildlife and contribute to nutrient cycling on rangelands. There are over 700 various species of grasshoppers in the U.S. However, the two major species affecting croplands are the two stripped grasshopper (*M. bivitattus*) and the red legged grasshopper (*M. femurrubrum*). Grasshopper and Mormon cricket outbreaks have the potential to significantly impair Utah's $343 million forage crop industry, but outbreaks have historically occurred throughout the 17 States that lie on or west of the 100th meridian.

Mormon crickets are a ground dwelling katydid that inhabits the Western Rocky Mountain basins. During outbreaks they create migratory bands that "march" across rangelands. At very high population densities they may damage the rangeland, but they are chiefly a pest when they enter and devour cultivated crops.

Often the damage done to agricultural commodities is increased by the effects of drought. Mild winters and hot, dry weather speed up the maturation process of these insects and allow more of them and their eggs to survive the cold. Drought also cuts into the population of birds and rodents that prey on them. In addition, drought reduces the fungal diseases that generally keep the insects' numbers down.

In the 2006 season, Utah Department of Agriculture and Food, in cooperation with USDA/APHIS-PPQ, continued their endeavors to manage the overpowering effects of grasshoppers and Mormon crickets in the state.

Grasshopper

All 29 counties in the state were surveyed for grasshopper infestation (Fig 1). Overall infestation acreage has gone down 50% year-over-year, making the infested acreage the lowest it has been in many years (Fig 2).

Mormon Cricket

All 29 counties in the state of Utah were surveyed for Mormon crickets (Fig 1). Infested acreage increased by 64% statewide for Mormon cricket (Fig 3). The total infested acreage statewide was 1,055,820 acres. Both aerial treatment and ground baiting were employed in suppression efforts in Box Elder county. 49,404 acres were treated with Dimilin in an every other swath pattern (Fig 4). Ground baiting was also used in Box Elder County, where 6,280 acres were treated.

Action Plan for 2007

Utah Department of Agriculture and Food and USDA/APHIS-PPQ will continue with extensive surveying in all counties for both Mormon crickets and grasshoppers. Aerial treatments are proposed in both the Grouse Creek/Park Valley/Yost area of Box Elder County and the Diamond Mountain area of Uintah/Daggett Counties. The proposed treatment area in Box Elder County totals 166,240 acres (Fig 5), and the treatment area in Uintah/Daggett Counties totals 75,820 acres (Fig 6).

In addition to aerial spraying in the Grouse Creek area, aerial baiting would enable treatment in areas which are not treatable with Dimilin by plane. These areas total 187,360 acres (Fig 5).

Treating this large area in Box Elder County will address the problem of re-infestation in treated areas, which has become a problem in the area.

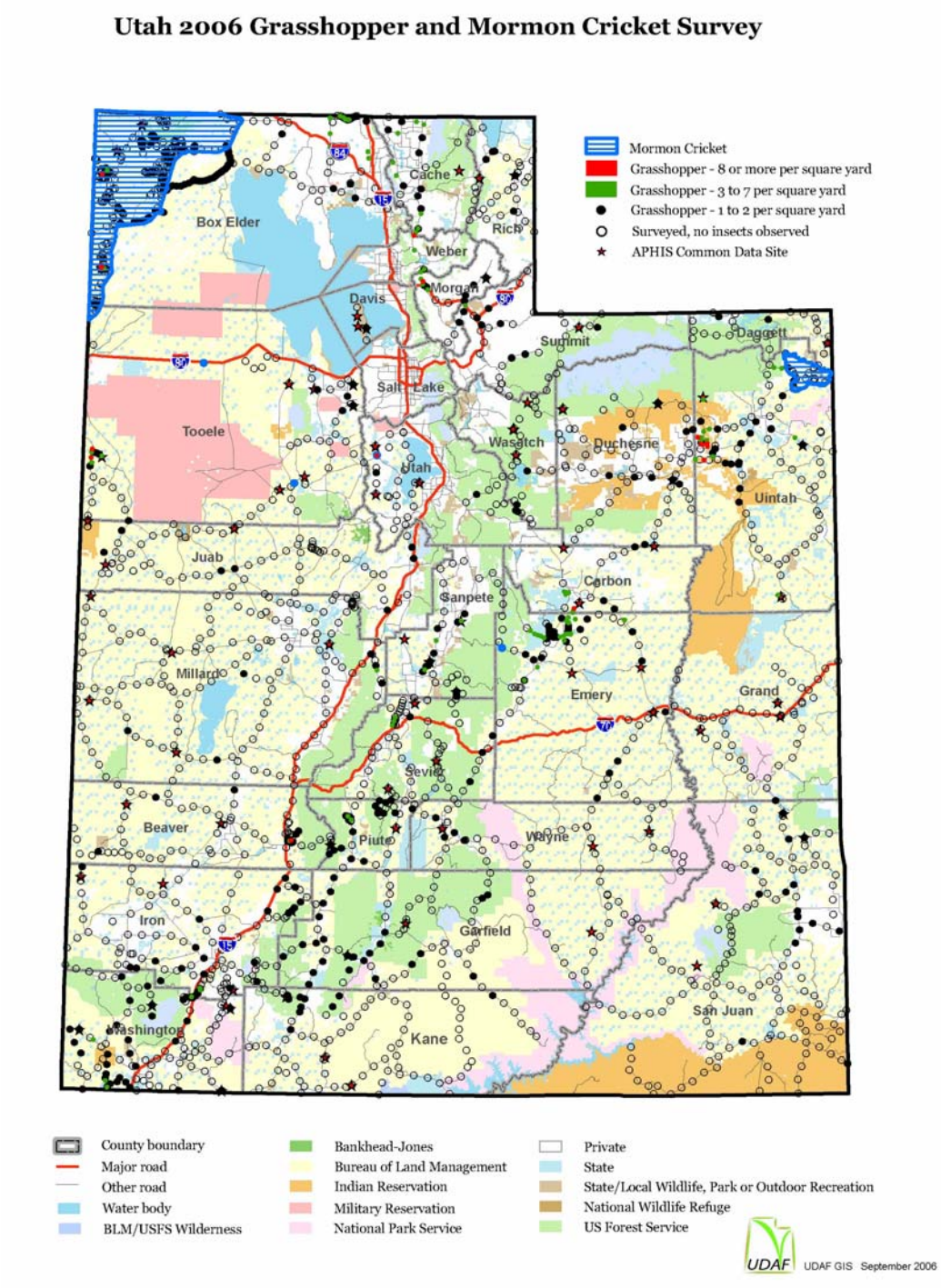


Figure 1. Statewide Mormon cricket and grasshopper survey.

Grasshopper Infested Acreage By Year

County	2000	2001	2002	2003	2004	2005	2006
Beaver	11,000	13,800	4,000	7,000	4,420	5,880	1,800
Box Elder	55,000	120,400	120,000	94,710	6,570	15,200	15,270
Cache	19,000	64,500	17,000	2,200	26,380	2,170	10,490
Carbon	12,300	56,100	21,600		2,700		5,860
Daggett	600	4,900		8,530	7,750	1,900	
Davis				2,530		3,010	
Duchesne	1,300	82,400	8,700	70,800	230,190		420
Emery	3,500	10,400	6,400		1,710	12,680	21,210
Garfield	6,800	10,900	4,200	52,560	13,780	24,450	
Iron	7,000	5,000	12,300	24,540	26,760	17,140	2,780
Juab	33,000	174,000		21,030	8,060	2,250	
Kane	10,300	1,300		16,710	13,680	7,570	
Millard	52,500	216,800	8,950	6,500	3,590		1,280
Morgan	19,000	63,100		2,530	25,710		5,530
Piute	21,000	18,200	32,600	40,310	5,990	13,870	2,560
Rich		12,400		32,140	68,830	4,000	
Salt Lake				2,530		2,530	
San Juan	23,000	3,900	2,500				
Sanpete	157,000	183,500	268,400	142,680	118,920	56,470	3,840
Sevier	58,000	31,000	70,500	78,000	22,870	16,850	3,830
Summit	10,000	3,600	2,550	12,630	33,870		1,280
Tooele	5,700	74,600	161,800	39,000	2,550	16,020	6,170
Uintah	36,000	71,200	53,500	25,750	100,950	12,670	20,510
Utah	29,000	56,400	8,500	15,150	16,440		1,280
Wasatch	3,000	65,600	7,000	17,540	25,250		
Washington		44,100	7,100	150	2,530		4,270
Wayne	2,000	2,000		10,430			
Weber	17,000						3,690
Total	593,000	1,390,100	863,900	725,950	769,500	214,660	112,070

2006 Grasshopper Acreage Statistics

County	Federal	State	Private	Total
Beaver	100		1,700	1,800
Box Elder	3,300		11,936	15,236
Cache	1,770	8,670		10,440
Carbon	250	1,550	4,060	5,860
Duchesne	110		300	410
Emery	3,480	4,100	13,590	21,170
Iron	450	370	1960	2,780
Millard	650	260	380	1,290
Morgan	310		5220	5,530
Piute	530	390	1630	2,550
Sanpete	310	1170	2360	3,840
Sevier	2100	280	1440	3,820
Summit	1180	100		1,280
Tooele	5650	520		6,170
Uintah	8510	110	11770	20,390
Utah			1280	1,280
Washington	3360	320	600	4,280
Weber	510		3180	3,690
Total	32,570	17,840	61,406	111,816

Figure 2. Grasshopper infested acreage by county and year.

Mormon Cricket Infested Acreage By Year

County	2000	2001	2002	2003	2004	2005	2006
Beaver	6,000	7,000	158,500	226,700	257,850	2,540	
Box Elder			108,300	125,900	276,620	499,550	966,340
Cache		8,100	4,400	8,400	8,260		
Carbon		33,100	33,100	2,530			
Daggett				4,600	21,450	7,610	8,160
Duchesne		83,900	7,000				
Emery		1,150	1,100	50			
Garfield				2,530	1,650		
Iron				7,600	70,790	3,040	
Juab	116,000	502,500	618,900	651,500	680,550	43,160	
Millard	190,000	539,500	536,500	517,800	547,700	19,610	
Rich						2,530	
Salt Lake						2,530	
San Juan		18,300	14,400		3,920		
Sanpete				31,760	310	4,380	
Sevier		24,500	85,500	190,200	177,420	1,570	
Summit					2,530		
Tooele	346,000	622,000	749,700	793,500	691,050	49,190	11,300
Uintah		48,800	48,900	31,300		5,070	68,740
Utah	500	5,650	74,600	116,200	123,800	3,780	1,280
Washington					4,600		
Total	658,500	1,894,500	2,450,650	2,710,670	2,868,500	644,560	1,055,820

2006 Mormon Cricket Acreage Statistics

County	Federal	State	Private	Total
Box Elder	403,732	57,967	504,641	966,340
Daggett	3,151	490	4,520	8,161
Emery	1,280			1,280
Tooele	6,360	1,470	3,470	11,300
Uintah	21,060	5,370	42,000	68,430
Utah			1,280	1,280
Total	435,583	65,297	555,911	1,056,791

Figure 3. Mormon cricket infested acreage by county and year.

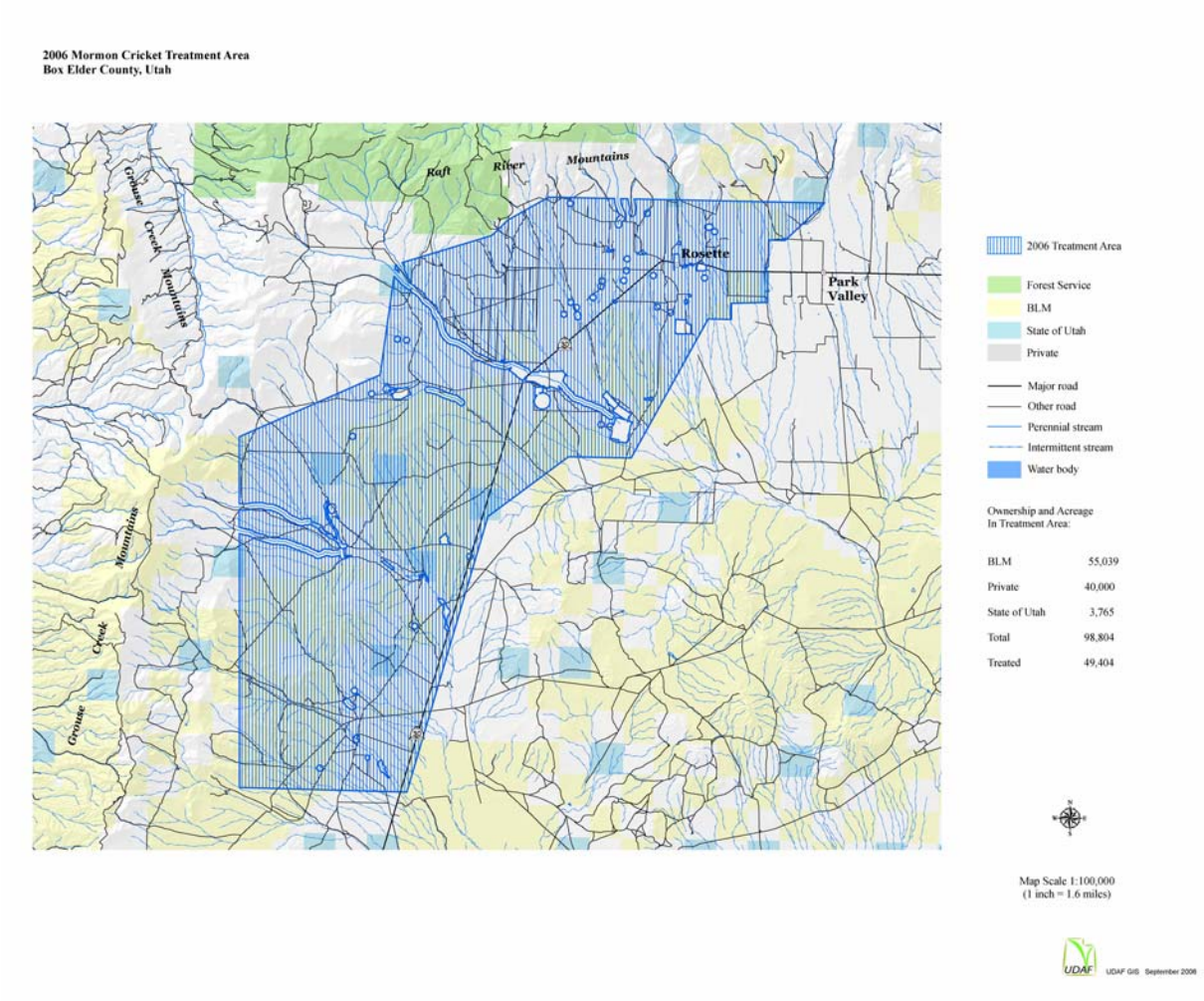


Figure 4. Aerial treatment in Park Valley, June 2006.

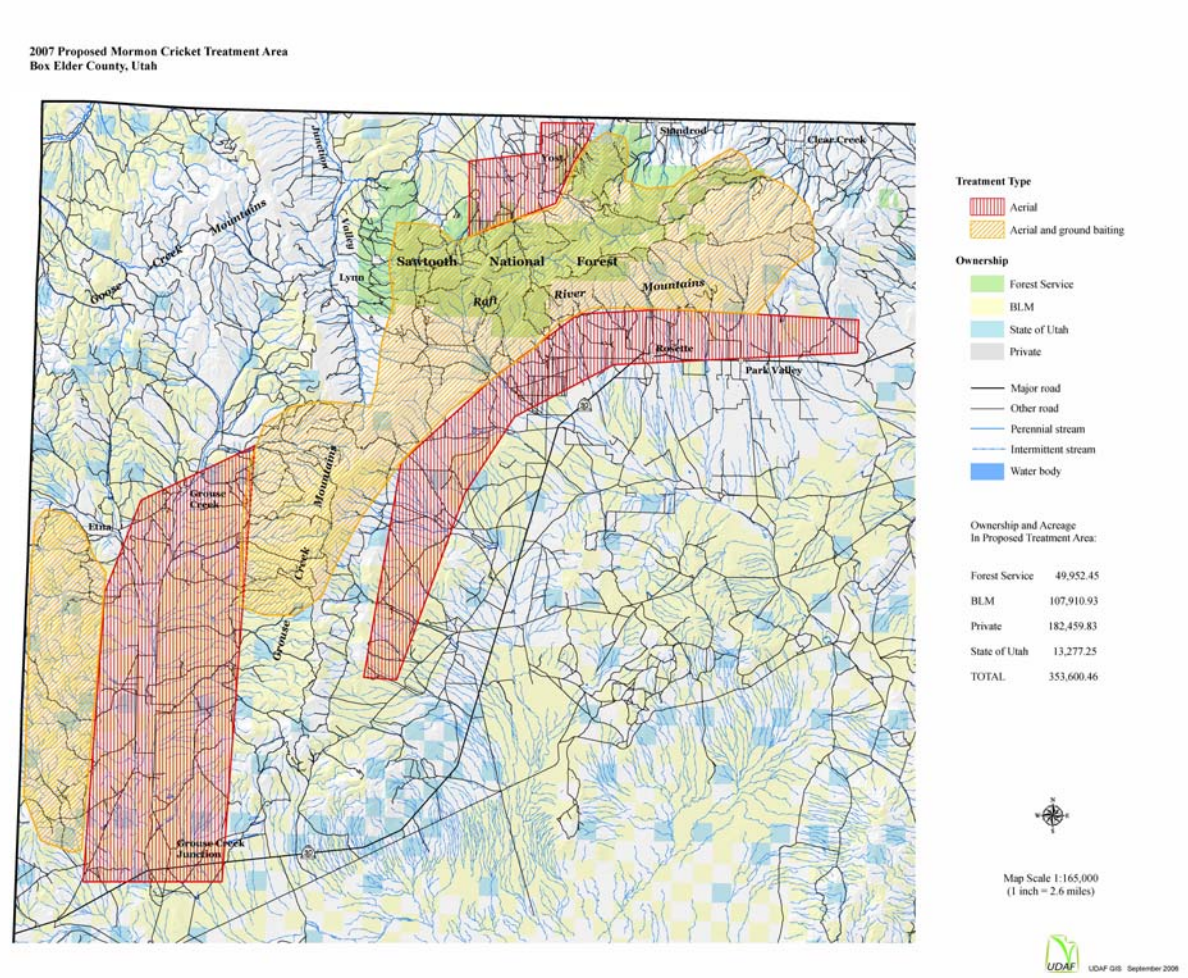


Figure 5. Proposed 2007 aerial treatment and aerial baiting map for Box Elder County.

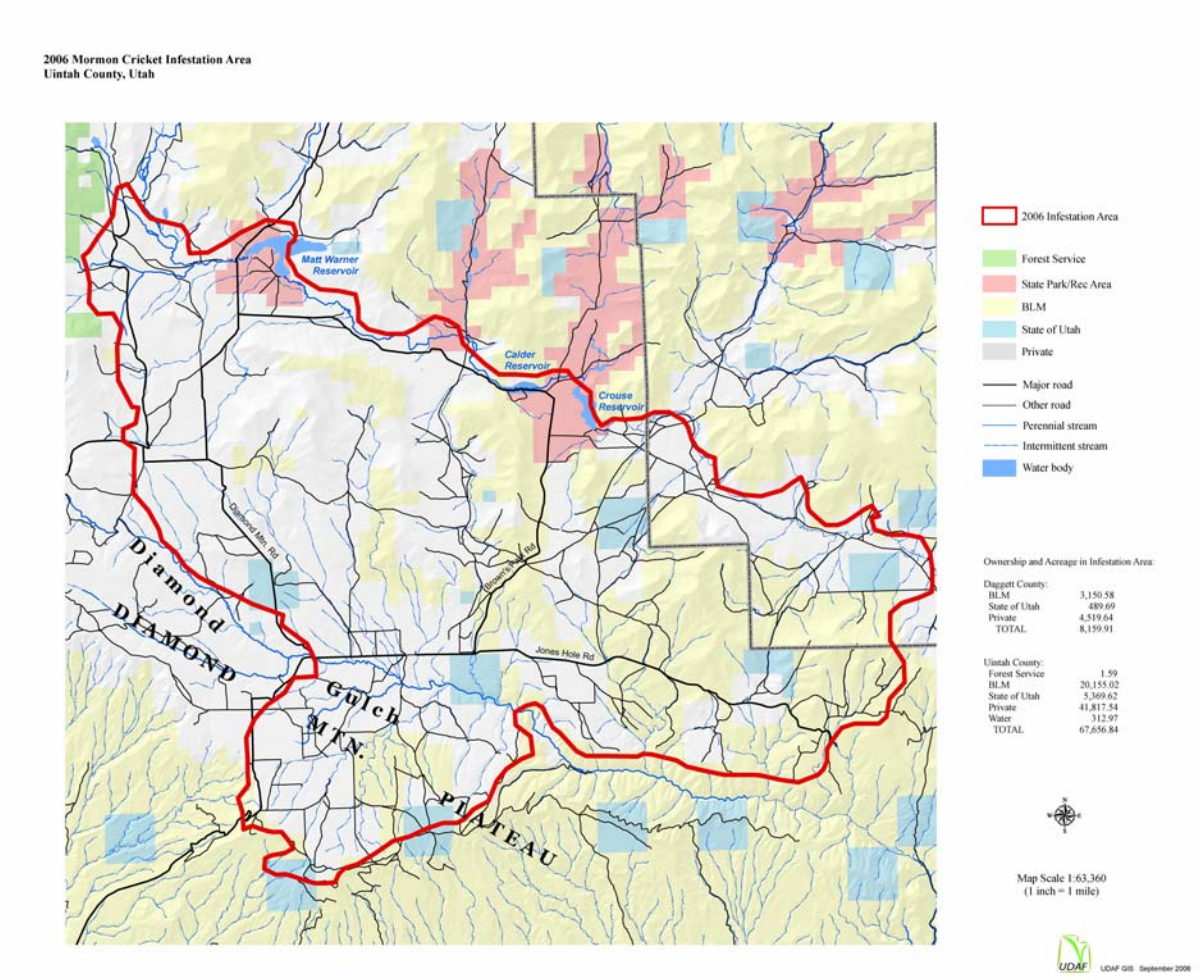


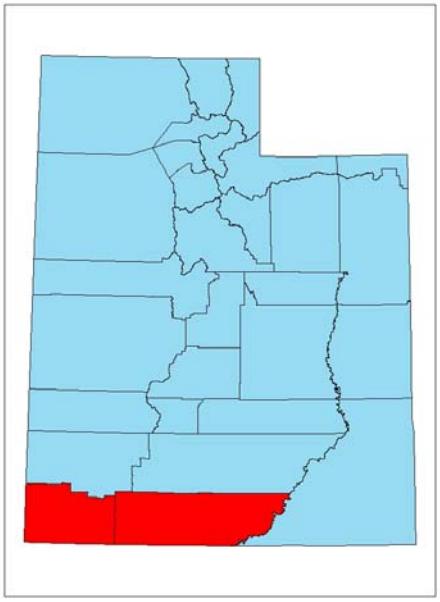
Figure 6. Proposed treatment area Uintah/Daggett Counties.

Red Imported Fire Ant Detection Program

Public Health Threat/ Quarantined Pest

2006 Survey Program

Counties with Pit Fall Traps



The red imported fire ant (RIFA) is both a public health and an economic threat. It is a federally quarantined pest and is not known to occur in Utah.

They were introduced into the U.S. from South America in the 1940's. Their current geographic distribution includes all of the Southern United States and the states of Arizona, Nevada, and California.

Red imported fire ants cause livestock damage, allergic reactions, agricultural and ornamental plant damage, and an increase in the use of pesticides. Economic damage associated with red imported fire ant in the United States exceeds $5 billion dollars.

The Utah Department of Agriculture and Food is approaching the red imported fire ant concern with pit fall trapping, quarantine enforcements, port of entry inspection, and public education. In 2006, program activity was focused in Washington and Kane Counties. A total of 58 pit fall traps were placed: 30 in Washington County and 28 in Kane County. The grids targeted high risk areas such as golf courses, nurseries, industrial areas. All specimens were identified to genus and members of the genus solenopsis were identified to species. No imported fire ants were detected in the survey for 2006. Utah is still free from imported fire ant populations.

Action Plan for 2007

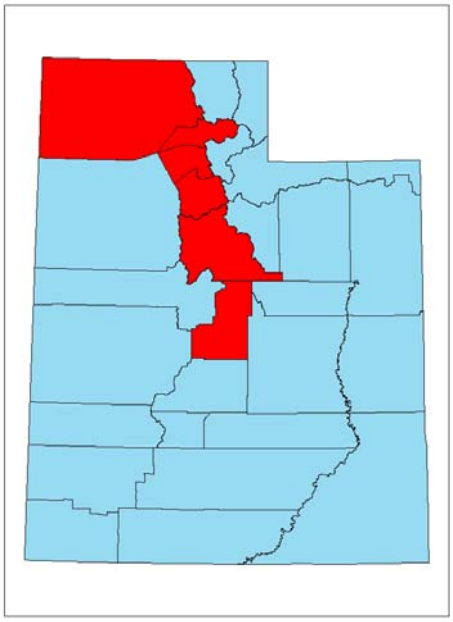
Red imported fire ants are a serious threat to Utah's economy. In 2007 UDAF plans to continue its cooperative program of public education, quarantine enforcement, and detection trapping. Additional state and federal funds have been applied for through the Cooperative Agricultural Pest Survey (CAPS) Program. These monies will be needed to support this program.

Siberian Silk Moth Detection Program

Defoliator/Forest Pest

2006 Survey Program

Counties with Traps



The Siberian silk moth, *Dendrolimus superans sibiricus* (Tschetverikov), is a defoliator of pine, fir, and spruce species. The risk to all conifers in the United States is extreme. The Siberian silk moth can spread between 12 and 50 km per year. Females can lay up to 300 eggs making populations of this pest increase rapidly.

The pest is native to northern Russia, but it has spread throughout Russia, Kazakhstan, northern China, Korea Democratic People's Republic, Korea Republic, and northern Mongolia. All imports from this area packaged in wood products are high risk for possible infestation.

In 2006, Utah Department of Agriculture and Food placed 120 traps in six counties. Traps were placed along shipping vectors within the state of Utah, such as railroads and highways. Airports and military bases were also trapped. Zero Siberian silk moths were caught in 2006.

Action Plan for 2007

Utah Department of Agriculture and Food will continue to identify high risk areas within Utah, and plans to set another 100 traps in 2007. Catching this pest before infestation is imperative.

West Nile Detection Program

Public Health Threat

2006 Survey Program

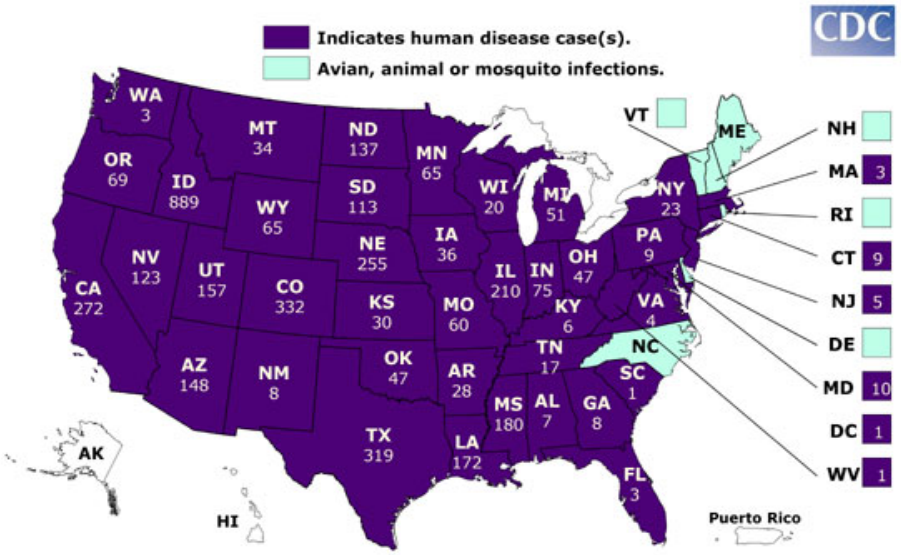
West Nile Virus was first detected in the State of Utah during the summer of 2003. This disease again appeared in Utah during the summer of 2006.

West Nile Virus is a disease transmitted by mosquitoes. In Utah, two principal mosquito vectors of West Nile Virus are: 1) Culex pipiens (the house mosquito) and 2) Culex tarsalis (the marsh mosquito). The major activity period for these disease vectors is from dusk until dawn. Daytime activity is almost non existent. Birds are the natural hosts of the disease with humans and horses serving as secondary hosts. The majority of people infected with West Nile Virus never develop symptoms. However, a small percentage may develop symptoms such as fever, headache, body aches, etc. A more serious form of the disease can occur when the virus infects the central nervous system.

Mosquito surveillance with additional control efforts were implemented in 2006. The State Legislature provided UDAF with $150,000 to fund these additional control efforts. Sentinel chicken flocks were increased, surveillance of wild bird populations was continued, domestic and wild horses were tested, and mosquito abatement was continued.

Action Plan for 2007

If funding is again provided, UDAF plans to continue the West Nile Virus Program with an emphasis on increased mosquito control to reduce West Nile Virus as a public health threat. UDAF will also continue to conduct education and outreach on issues concerning West Nile Virus and mosquito abatement program.

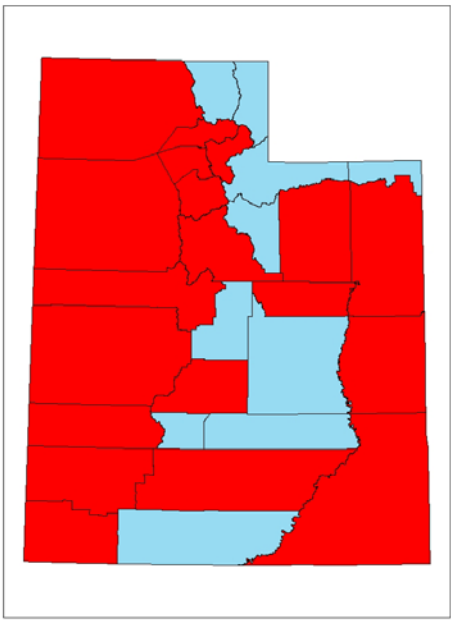


Wood Borer and Bark Beetle Trapping Program

Quarantine Pest

2006 Survey Program

Counties with Traps



Utah Department of Agriculture and Food (UDAF), Plant Industry performed a survey for invasive wood boring bark beetles and long horned beetle with funding provided through the Cooperative Agricultural Pest Survey Program (CAPS) which is administered by United States Department of Agriculture (USDA), Animal Plant Health Inspection Service (APHIS), Plant Protection Quarantine (PPQ), and USDA Forest Service Early Detection and Rapid Response (EDRR) Program. Further cooperation was provided by the Port of Salt Lake Customs and Border Protection. These pests are of economic importance because of their ability to damage urban and natural forests, commercial forest and orchard industries. The risk of introduction is great considering the increased demand for inexpensive commodities from the continent of Asia. The pests are introduced from wood packing material and other raw products; tile, stone, and dunage that are brought in by sea containers to the state via railroads and trucking industries.

Trap sites were selected in areas that receive raw or unrefined products and wood packing materials. In 2006, 35 trap sites were chosen throughout 20 counties (Figure XXX). Each site contained three lingren funnel traps baited with ethanol and a-pinnene lure, ips complex lure, and ethanol lure respectively. Each trap was collected biweekly, screened for target species or species of interest, and mounted at UDAF. Traps were generally set in April and retrieved in November. The Scolytinae (bark beetle) specimens were then identified to specie by Dr. Stephen Wood, Curator of Insects at the Mont L. Bean Museum of Life (Emeritus). The Cerambycidea specimens were screened by Alan Roe, and identified by Dr. Jim LaBonte Survey Entomologist/Taxonomist for Oregon Department of Agriculture. The Buprestidae specimens were identified by R.L. Westcott, Oregon Department of Agriculture.

Several new state records were found in 2006:

Family Scolytinae:

Gnathatrichus pilosus (Leconte) in Iron, Davis, and Weber counties, and *Hylastes ruber* (Swaine) in Box Elder county. The specimens are now part of Dr. Wood's contributions to the entomological collection at the Smithsonian Museum in Washington D.C.

Family Cerambycidae:

Saperda tridentata (elm borer) has been identified as part of the CAPS Exotic Woodborer and Bark Beetle survey in Utah. The beetle was detected in Lindgren trap samples from Morgan County in July 2006. Specimen will be submitted to other specialists for verification.

Family Bostrychidae

Bostrychoplites cornutus, an exotic wood borer, was identified and has been submitted to USDA for verification. The specimen was submitted from Washington County in September 2006 after it emerged from a wooden drum shipped from Zimbabwe. A record for this pest has been uploaded to NAPIS.

Family Buprestidae

Sample is currently being identified by R.L. Wescott, Oregon Department of Agriculture.

In addition, other mounted specimens of interest collected in 2006 are now part of UDAF's ongoing reference collection which will aid in future identification of native and non-native insect species.

Action Plan for 2007

Assuming continued funding, trapping procedures will remain the same. Trap locations will continue to target areas with a high risk of target species introduction such as businesses importing from Europe and Asia. In particular, more traps will be placed in proximity to businesses dealing foreign motorcycles due to the high volume of packaging material such as hard and soft wood packing material. UDAF will continue to coordinate with Port of Salt Lake and SITC hot zone lists to target areas for trap placement and visual inspections. Wood processing areas will also be targeted for trapping. Detection in these areas will either confirm known existing species or reveal new species present in Utah's urban and natural forests.

County	# of trap sites
Beaver	2
Carbon	1
Davis	2
Duchesne	1
Emery	1
Garfield	1
Grand	1
Iron	1
Juab	1
Millard	1
Morgan	1
Salt Lake	11
San Juan	1
Sevier	1
Tooele	1
Uintah	1
Utah	1
Washington	2
Weber	3

Figure 1. Traps Per County

TARGET INSECTS FOR SURVEY	
Scientific Name(s)	**Common Name(s)**
Agrilis planipennis (Fairmaire)	Emerald Ash Borer (EAB)
Anoplophora chinensis (Forster) = *Anoplophora malasiaca* (Thompson)	Rough Shouldered; Citrus Longhorned Beetle(CLB)
Anoplophora glabripennis (Motchulsky)	Asian Longhorned Beetle (ALB)
Callidiellum rufipenne (Motchulsky)	Lesser Japanese Cedar Longhorned Beetle
Chlorophorous annularis (Fabricius)	Bamboo/Tiger Bamboo Longhorned Beetle
Hesperophanes (Trichoferus) campestris (Faldermann)	Chinese Longhorned Beetle
Hylurgops (Hylurgus) palliatus (Gyllenhal)	N/A
Hylurgus ligniperda (Fabricius)	Red-haired Pine Bark Beetle
Ips sexdentatus (Boerner)	Six-toothed Bark Beetle
Ips typographus (Linneaus)	European Spruce Bark Beetle
Monochamus alternatus (Hope)	Japanese Pine Sawyer
Pityogenes chalcographus (Linneaus)	Spruce Engraver
Tetropium castaneum (Linneaus)	N/A
Tetropium fuscum (Fabricius)	Brown Spruce Longhorned Beetle (BSLB)
Tomicus minor (Hartig)	Lesser Pine Shoot Beetle
Tomicus piniperda (Linneaus)	Pine Shoot Beetle; Japanese Pine Engraver
Trypodendron domesticus (Linneaus)	N/A

Figure 2. Target Insect Species

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Greg Abbott

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Summary of Invasive and Native Pest Risks

Insect	Damage
Africanized Honey Bee	Potential to disrupt Utah's $1.1 million honey industry, and cause health risks to humans and livestock
Apple Maggot and Cherry Fruit Fly	Fruit industry pest, potential to devastate Utah's $18 million fruit industry
Cereal Leaf Beetle	Potential to significantly reduce Utah's $343.3 million small grain and field crop industry
European Corn Borer	Potential to devastate Utah's $31.5 million corn harvest
False Codling Moth	Potential to cause significant damage to Utah's $18 million fruit industry
Gypsy Moth	Potential to destroy Utah's watersheds, forests, and residential landscapes
Japanese Beetle	Potential to significantly damage Utah's $20 million sod industry, Utah's $124 million nursery and floriculture industry, and the $18 million fruit industry
Mormon Cricket and Grasshopper	Potential to significantly reduce Utah's $343.3 million forage crop industry
Red Imported Fire Ant	Economic damage caused in the United States exceeds $5 billion, and is a public health risk
Siberian Silk Moth	Threat to Utah's coniferous forests
West Nile Virus	Public and animal health threat
Wood Borer and Bark Beetle	Potential to seriously damage Utah's forests and urban/residential landscapes